

LARVAE OF THE FAMILIES OF COLEOPTERA: A
BIBLIOGRAPHIC SURVEY OF RECENT PAPERS
AND TABULAR SUMMARY OF 7 SELECTED
ENGLISH LANGUAGE CONTRIBUTIONS.

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ABSTRACT

This paper summarizes the current knowledge of nearly 200 families of beetle larvae; indicates known illustrations, descriptions, and keys for each; and presents a selected list of 183 references. Page and figure references are provided for 7 recent, comprehensive, and readily available publications.

INTRODUCTION

Although there are many papers and books in which Coleoptera larvae are described it remains a problem quickly to locate descriptions, keys, and figures of examples of the larvae of the nearly 200 recognized families of beetles. One must perform a fairly extensive literature search simply to determine whether any larval form for a family has yet been described. This paper has 3 aims: (1) to summarize, in an easily visible form, the current knowledge of the families of Coleoptera larvae; (2) to indicate sources for illustrations of the described larvae, and where possible, of English language descriptions and keys to known larval types; and (3) to present a selected list of references to the larval forms of each family.

Several older papers, not treated in detail in this review, deserve special mention as sources for figures and descriptions; Perris (126), Schiodte (146), and Verhoef (170). Among the papers presenting keys to many families, but not treated here are: Blair (26), Chang (35), Esaki *et al.* (62), Gilyarov (69), Rymer-Roberts (137) and Viedma (172).

Information on rearing and preserving beetle larvae can be found in many papers, in particular: Peterson (127), Van Emden (56), and Walsh and Dibb (178).

Boving and Craighead (29) and others have treated the subfamilies of some Coleoptera families (*e.g.* Chrysomelidae, Colydiidae, Curculionidae) as separate families, basing their decisions on larval characteristics. Since lumping these subfamilies back into broader, more conservative, families would decrease the information and obscure alternative taxonomic interpretations, such cases are treated below as the original author indicated and are cross referenced to the family in its broader interpretations.

This paper is arranged in 2 parts; (1) a tabular summary of descriptions and illustrations of the larvae of the beetle families of the World (Table 1); (2) a selected bibliography. The references are selected on the basis of comprehensiveness or special interest, and generally, they do not duplicate those cited in the following papers: Brues *et al.* (32), Beutenmuller (24), Peterson (127) and Wade (177). Most of the papers published after 1950, and many earlier ones may be obtained on micro-film or photostat from the National Agricultural Library.

Table 1 summarizes 7 important English language works dealing with Coleoptera larvae: Arnett (4), Böving and Craighead (30), Chu (38), Crowson (41), Peterson (127), Van Emden (57, 58). These 7 were chosen because they are comprehensive, recent, and available to most workers. Entries are arranged by: (1) family name, (2) reference source by author, (3) page and plate or figure numbers within the reference, (4) reference by number to any additional papers in the list of references, and (5) cross-reference to other names commonly used for the family. The cross-references to family names are based on Arnett (3-4). Larvae that are not presently known to me to be described are so indicated, as are those whose descriptions are inadequate.

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TABLE 1

Numbers in parentheses following author's name refer to page or figure reference; those preceded by # are the numbers in the references cited section.

- ACANTHOCERIDAE: (see also Scarabaeidae), Böving & Craighead (52), Crowson (29).
 ADERIDAE: (undescribed).
 AEGIALITIDAE: (see Salpingidae).
 ALLECULIDAE: Arnett (702), Böving & Craighead (42, pl. 56), Chu (116), Crowson (115), Peterson (18, 25, C4, C7, C46), Van Emden #57 (219, 220, 262); see also #162.
 AMPHIZOIDAE: Arnett (183), Böving & Craighead (17, pl. 7), Chu (78), Crowson (6), Peterson (8, 25, C40); see also #51, 169.
 ANASPIDIDAE: (see also Melandryidae), Böving & Craighead (39, pl. 47).
 ANISOTOMIDAE: (see Leiodidae).
 ANOBIIDAE: Arnett (567) Böving & Craighead (62, pl. 101), Chu (119), Crowson (77), Peterson (8, 26, C2, C5, C10, C16, C28), Van Emden #57 (212, 215, 264, f.50); see also #28, 168.
 ANTHICIDAE: Arnett (747), Böving & Craighead (39, 60, 74, pl. 46), Chu (111), Crowson (135), Peterson (17, 26, C52), Van Emden #57 (218, 260, f. 26).
 ANTHRIBIDAE: Arnett (959), Böving & Craighead (66, pl. 117), Chu (128), Crowson (156), Peterson (7, 8, 65, C26, C27), Van Emden #57 (211, 212, 264, f.51); see also #107.
 APIONIDAE: (see also Curculionidae), Böving & Craighead (67, pl. 120), Chu (127), Crowson (158), Peterson (78).
 ATTELABIDAE: (see also Curculionidae), Böving & Craighead (66, pl. 118), Chu (127), Crowson (158).
 BELIDAE: (see also Curculionidae), Crowson (156).
 BIPHYLLIDAE: Arnett (789) Crowson (93).
 BORIDAE: (see also Salpingidae), Böving & Craighead (41, 60, pl. 48, pl. 55) Crowson (117).
 BOSTRICHIDAE: Arnett (581), Böving & Craighead (62, pl. 101), Chu (120), Crowson (77), Peterson (10, 27, C28), Van Emden #57 (215, 264) Van Emden #58 (267), f.27, f.28, f.33) see also #105.

- BRACHYPSECTRIDAE: Arnett (529), Böving & Craighead (13, 46, pl. 74, pl. 75) Chu (96), Crowson (65).
- BRATHINIDAE: Undescribed.
- BRENTIDAE: Arnett (967), Böving & Craighead (15, 66, pl. 118), Chu (125), Crowson (158), Peterson (8, 27, C58).
- BRUCHIDAE: Arnett (951), Böving & Craighead (15, 63, pl. 103), Chu (121), Crowson (143), Peterson (7, 28, C29), Van Emden #57 (212, 215, 264, f.54).
- BUPRESTIDAE: Arnett (481), Böving & Craighead (13, 49, pl. 80), Chu (94), Crowson (58), Peterson (7, 28, C13), Van Emden #57 (253, f.44), see also #1, 9, 10.
- BYRRHIDAE: Arnett (451), Böving & Craighead (12, 43, pl. 61, pl. 62), Chu (90), Crowson (52), Peterson (9, 29, C5, C7, C30), Van Emden #57 (215, 217, 226).
- BYTURIDAE: Arnett (791), Böving & Craighead (39, 40, 75, pl. 45), Chu (111), Crowson (93), Peterson (16, 29, C3, C45), Van Emden (218, 256, f.28).
- CALLIRHIPIDAE: (see also Rhipiceridae); Crowson (57).
- CALYPTOMERIDAE: Undescribed.
- CAMPTOSOMATIDAE: (see also Chrysomelidae); Böving & Craighead (64, 79, pl. 107).
- CANTHARIDAE: Arnett (535), Böving & Craighead (11, 47, 48, pl. 77, pl. 78), Chu (97), Crowson (67), Peterson (11, 30, C1, C2, C56), Van Emden #57 (f.20).
- CARABIDAE: Arnett (55), Böving & Craighead (17, 18, pl. 4), Chu (76), Crowson (5), Peterson (8, 31, C1, C2, C6, C8, C40), Van Emden #57 (210, 224, f.8), see also #2, 27, 45, 55, 72, 73, 86, 115, 117, 132, 133, 149.
- CASSIDIDAE: (see also Chrysomelidae), Böving & Craighead (66, pl. 116).
- CATOPIDAE: (see Leptodiridae).
- CEBRIONIDAE: Arnett (494), Böving & Craighead (50, pl. 79), Chu (96), Crowson (61), Peterson (12).
- CEPHALOIDAE: Arnett (733), Böving & Craighead (41, 60, pl. 52), Chu (113), Crowson (119), Peterson (16, 18, 31, C.50).
- CERAMBYCIDAE: Arnett (851), Böving & Craighead (66, pl. 99, pl. 100), Chu (51, 101), Crowson (139), Peterson (7, 32, C6, C14, C15, C16, C58), Van Emden #57 (211, 216, 264), see also #36, 46-50, 53, 75, 108, 142, 174.
- CEROPHYTIDAE: Undescribed.
- CERYLONIDAE: (see also Colydiidae), Crowson (96).
- CHAETOSOMATIDAE: see #42.
- CHELONARIIDAE: Arnett (463), Böving & Craighead (45, pl. 71), Chu (93), Crowson (54).
- CHRYSOMELIDAE: Arnett (899), Böving & Craighead (65, pl. 109), Chu (122-125), Crowson (141), Peterson (9-11, 13, 19, 33-36, C1, C3, C5-8, C32-38, C58), Van Emden #57 (211, 213, 215-217, 264, f.7, f.33, f.53), see also #95, 111, 118, 160, 163, 169.
- CICINDELIDAE: Arnett (51), Böving & Craighead (9, 17, pl. 4), Chu (76), Crowson (5), Peterson (8, 37, C5, C41), Van Emden #57 (210, 224, f.36), Van Emden #58 (210, f. 1-6).
- CISIDAE: Arnett (827), Böving & Craighead (55, pl. 92), Chu (100), Crowson (93), Peterson (14, 15, 37, C5, C54), Van Emden #57 (217, 260, 262).
- CLAMBIDAE: Arnett (440), no adequately illustrated description available.
- CLAVIGERIDAE: (see also Pselaphidae) Undescribed.
- CLERIDAE: Arnett (599), Böving & Craighead (56, 57, pl. 95), Chu (99), Crowson (82), Peterson (12, 38, C54), Van Emden #57 (214, 216, 253, f. 45) Van Emden #58 (215, f. 11-18).
- COCCINELLIDAE: Arnett (805), Böving & Craighead (38, 39, pl. 37), Chu (51, 109), Crowson (96), Peterson (14, 17, 38, C2, C5, C8, C38, C39), Van Emden #57 (216, 219, 254, f.35) see also #140.
- COLYDIIDAE: Arnett (839), Böving & Craighead (8, 40, 57, pl. 49), Chu (100, 111-112), Crowson (115) Peterson (13, 14, 16, C4, C50), Van Emden #57 (216, 218-220, 256, 258) see also #81.

CONONOTIDAE: Undescribed.

CORYLOPHIDAE: see Orthoperidae.

CRYPTOPHAGIDAE: Arnett (783), Böving & Craighead (34, pl. 29), Chu (104), Crowson (96), Peterson (16, 40, C4, C51), Van Emden #57 (218, 220, 256).

CUCUJIDAE: Arnett (775), Böving & Craighead (34, pl. 31), Chu (100, 104-106), Crowson (95), Peterson (12, 15, 17, 40, C1, C3, C7, C49), Van Emden #57 (217, 254, 256), see also #25, 81, 82.

CUPEDIDAE: Arnett (45), Böving & Craighead (6, 16, pl. 1), Chu (73), Crowson (4).

CURCULIONIDAE: Arnett (971), Böving & Craighead (67, pl. 120-122), Chu (51, 126-127), Crowson (158), Peterson (8, C2, C7-8, C18-25), Van Emden #57 (211, f.12, f.19, f.31-32), see also #104, 109, 110, 143, 163, 166, 169, 182.

CYBOCEPHALIDAE: (see also Nitidulidae), Böving & Craighead (37, pl. 37), Crowson (91, 99).

DASCILLIDAE: Arnett (441), Böving & Craighead (8, 44, pl. 63), Chu (89, 93, 96, 102), Crowson (51), Peterson (9), Van Emden #57 (214, 217, 226, f.13), Van Emden #58 (214), see also #18, 169.

DASYCERIDAE: Undescribed.

DERMESTIDAE: Arnett (561), Böving & Craighead (55, pl. 89-90), Chu (98, 111), Crowson (72), Peterson (14, 42, C3, C5, C45), Van Emden #57 (217, 226), see also #81, 122, 125, 155.

DERODONTIDAE: Arnett (555), Böving & Craighead (8, 33, pl. 27), Chu (102), Crowson (72), see also #64.

DISCOLOMIDAE: Crowson (98).

DONACIIDAE: (see also Chrysomelidae), Böving & Craighead (63, pl. 106).

DRILIDAE: Böving & Craighead (46, pl. 74-75, pl. 77), Crowson (65).

DRYOPIDAE: Arnett (471), Böving & Craighead (45-46, pl. 70-73), Chu (93), Crowson (55), Peterson (13, 42, C43), Van Emden #57 (213, 226, f. 4) see also #14, 16, 19, 169.

DYTISCIDAE: Arnett (191), Böving & Craighead (17, 23, pl. 6), Chu (77), Crowson (6), Peterson (8, 43, C2, C6, C8, C41-42), Van Emden #57 (224, f. 90) see also #13, 17, 20, 66, 169.

ELATERIDAE: Arnett (497), Böving & Craighead (50, 51, pl. 83-86), Chu (95), Crowson (61), Peterson (10, 12, 44, C5-7, C46-C47) Van Emden #57 (214, 254) see also #8, 37, 59, 99, 119-121, 131, 181.

ELMIDAE: Arnett (474), Crowson (55), Peterson (13, 42, C43), see also #12, 80, 169.

ENDOMYCHIDAE: Arnett (799), Böving & Craighead (8, 38, pl. 39-40), Chu (108), Crowson (98), Peterson (18, 45, C3, C53), Van Emden #57 (219, 220, 258).

EROTYLIDAE: Arnett (817), Böving & Craighead (39, pl. 41), Chu (103-104, 110), Crowson (96), Peterson (14, 46, C3, C7, C53), Van Emden #57 (216, 218, 258, 260, f. 49), see also #138.

EUCINETIDAE: Arnett (449), Böving & Craighead (33, 43, 73, pl. 26), Chu (102), Crowson (51), see also #169.

EUCNEMIDAE: Arnett (521), Böving & Craighead (13, 50, pl. 71), Chu (95), Crowson (62), Peterson (7, 73, C17), Van Emden #57 (211, 254), Van Emden #58 (218, f. 19, f. 23).

EUGLENIDAE: Arnett (754), Böving & Craighead (39, 60, 75), No adequate description available.

EURYOPOGONIDAE: (see also Dascillidae) Böving & Craighead (8, 45, pl. 69), Chu (93), Crowson (54).

EURYSTETHIDAE: (see Salpingidae).

GALERUCIDAE: (see also Chrysomelidae) Böving & Craighead (65, pl. 110-114).

GEORYSSIDAE: Undescribed.

GEOTRUPIDAE: (see also Scarabaeidae), Böving & Craighead (52), Crowson (69).

GYRINIDAE: Arnett (207) Böving & Craighead (24, pl. 6), Chu (74), Crowson (6), Peterson (8, 46, C2, C6, C41), Van Emden #57 (210, 224, f. 14) see also #20, 141.

- HALIPLIDAE: Arnett (187), Böving & Craighead (17, 24, pl. 5), Chu (75), Crowson (6), Peterson (8, 47, C1, C6, C42), Van Emden #57 (210, 224, f. 17) see also #13, 20, 87.
- HELODIDAE: Arnett (445), Böving & Craighead (44, pl. 65), Chu (90, 92), Crowson (51) Peterson (13, 15, 47, C4, C50), Van Emden #57 (217, 226), see also #169.
- HELOTIDAE: Undescribed.
- HEMIPEPLIDAE: (see also Cucujidae), Böving & Craighead (35, pl. 31), Crowson (117).
- HETEROCERIDAE: Arnett (465), Böving & Craighead (7, 44, pl. 64), Chu (89), Crowson (54), Peterson (14-15, 48, C4, C43), Van Emden #57 (216, 226, f. 24, f. 42).
- HISPIDAE: (see also Chrysomelidae) Böving & Craighead (66, pl. 115).
- HISTERIDAE: Arnett (369), Böving & Craighead (9, 11, 25, 31, pl. 20-21), Chu (117), Crowson (21), Peterson (12, 48, C2, C5, C7, C41), Van Emden #57 (212, 225), see also #81.
- HOMALISIDAE: Böving & Craighead (47), Crowson (65).
- HYDRAENIDAE: (see Limnebiidae).
- HYDROCHIDAE: Böving & Craighead (7, 32, pl. 22), Chu (118), Crowson (20).
- HYDROPHILIDAE: Arnett (215), Böving & Craighead (32, pl. 22-24), Chu (79, 117-118), Crowson (21), Peterson (7, 11-12, 15, 49, C6, C44), Van Emden #57 (210, 212, 213, 216, 225, f. 15, f. 38), see also #15, 19, 21, 116, 130, 156, 169.
- HYDROSCAPHIDAE: Arnett (213), Böving & Craighead (25, 26, 31, pl. 9), Chu (79).
- HYGROBIIDAE: Böving & Craighead (17, pl. 5), Chu (77), Crowson (6), Van Emden #57 (210, 224, f. 1), Van Emden #58 (213), see also #13, 169.
- HYPOCOPRIDAE: Undescribed.
- INOPEPLIDAE: (see also Cucujidae and Staphylinidae) Böving & Craighead (35), Crowson (117), see also #183.
- JACOBSONIIDAE: (see Sarothridae).
- KARUMIIDAE: Undescribed.
- LAGRIIDAE: Arnett (697), Böving & Craighead (42, pl. 60), Chu (116), Crowson (115) Peterson (18, 50, C4, C52), Van Emden #57 (219, 262), Van Emden #58 (259), see also #78.
- LAMPYRIDAE: Arnett (547), Böving & Craighead (11-13, 48, pl. 74-75), Chu (97), Crowson (67), Peterson (11, 50, C1-2, C8, C56), Van Emden #57 (f. 21, f. 43).
- LANGURIIDAE: Arnett (795), Böving & Craighead (34, 40, 60, pl. 28), Chu (103), Crowson (96), Peterson (16, 51, C51) Van Emden #57 (219, f. 6).
- LATHRIDIIDAE: Arnett (835), Böving & Craighead (8, 33, 38, 74, pl. 25), Chu (101-102), Crowson (98), Peterson (15, 51, C3, C53), Van Emden #57 (219, 220, 256, f. 27).
- LEIODIDAE: Arnett (343), Böving & Craighead (7, 25, 26, 71, pl. 11), Chu (80), Crowson (29), see also #91, 124.
- LEPICERIDAE: Undescribed.
- LEPTINIDAE: Arnett (339), Böving & Craighead (7, 25, 26, 43, pl. 10), Chu (80), Crowson (29), Peterson (15, 52, C4, C55), Van Emden #57 (213, 225, f. 3, f. 18, f. 34, f. 41), Van Emden #58 (213), see also #91, 180.
- LEPTODIRIDAE: See #44, 124, 139, 161.
- LIMNEBIIDAE: Arnett (227), Böving & Craighead (7, 25, 26, 31, pl. 8), Chu (79), Crowson (20), Peterson (49), see also #124, 139.
- LIMNICHIDAE: Arnett (467), Crowson (55), no adequately illustrated description available.
- LIMULODIDAE: Arnett (353), Crowson (27), see also #124.
- LUCANIDAE: Arnett (387), Böving & Craighead (8, 51, pl. 87), Chu (87), Crowson (43), Peterson (9, 52, C10, C31), Van Emden #57 (215), see also #52, 54, 61, 68, 77, 134.
- LYCIDAE: Arnett (541), Böving & Craighead (48, pl. 76), Chu (98), Crowson (67), Peterson (11, 53, C56), Van Emden #57 (f. 22).
- LYCTIDAE: Arnett (589), Böving & Craighead (63, pl. 102), Chu (120), Crowson (77), Peterson (10, 53, C3, C6, C30), Van Emden #57 (215, 264, f. 30), Van Emden #58, (265, f. 24-28), see also #106.

- LYMEXYLIDAE: Arnett (617), Böving & Craighead (68, pl. 124), Chu (128), Crowson (86), Peterson (17, 54, C6-7, C17), Van Emden #57 (219-220, 262, f. 52), Van Emden #58 (259, f. 24, f. 29).
- MALACHIIDAE: see Melyridae.
- MELANDRYIDAE: (see also Tetratomidae), Arnett (723), Böving & Craighead (39, 60, 74, pl. 43) Chu (110), Crowson (119), Peterson (13-14, 16-18, 54, C1, C4, C10, C49, C58), Van Emden #57 (216, 258), see also #173.
- MELASIDAE: See Eucnemidae.
- MELOIDAE: Arnett (621), Böving & Craighead (58, 59, 60, pl. 96), Chu (85) Crowson (119), Peterson (6, 10, 56, C6, C57), Van Emden #57 (212, 214, 260), Van Emden #58 (219, f. 21-23), see also #101, 147, 148.
- MELYRIDAE: Arnett (607), Böving & Craighead (8, 55, pl. 91-92), Chu (99), Crowson (82), Peterson (14, 57, C3, C54), Van Emden #57 (214, 253), see also #42, 63.
- MENGEIDAE: Crowson (168).
- MEROPHYIIDAE: Crowson (98).
- MERYCIDAE: Undescribed (see also Colydiidae).
- MICROMALTHIDAE: Arnett (553), Böving & Craighead (6, 9, 16, pl. 2), Chu (45, 74), Crowson (4), Peterson (7, 57, C51).
- MICROPEPLIDAE: Böving & Craighead (26, 31), Van Emden #57 (217, 225), see also #91. No adequately illustrated description available.
- MONOEDIDAE: (see also Colydiidae), Böving & Craighead (40, 75).
- MONOMMIDAE: Arnett (707), Peterson (15, 58, C58).
- MONOTOMIDAE: (see also Rhizophagidae) Böving & Craighead (33, pl. 25), Chu (103, 107), Van Emden #57 (218, 256).
- MORDELLIDAE: Arnett (629), Böving & Craighead (39, 60, 74, pl. 98), Chu (118), Crowson (119), Peterson (8, 58, C6, C51), Van Emden #57 (212, 262).
- MURMIDIIDAE: (see also Colydiidae) Böving & Craighead (38, pl. 27), Chu (108), Crowson (91), Peterson (15, 59, C53), Van Emden #57 (220, 258), see also #81.
- MYCETOPHAGIDAE: Arnett (847), Böving & Craighead (40, pl. 50), Chu (112), Crowson (114), Peterson (16, 59, C4, C50), Van Emden #57 (219, 258, f. 25), see also #81.
- MYCTERIDAE: Undescribed (see also Salpingidae).
- MYLABRIDAE: See Bruchidae.
- NEMONYCHIDAE: (see also Curculionidae), Crowson (156).
- NILIONIDAE: Böving & Craighead (42, pl. 59), Chu (116), Crowson (115).
- NITIDULIDAE: Arnett (757), Böving & Craighead (12, 36, pl. 35), Chu (107), Crowson (93), Peterson (14, 16, 17, 60, C3, C5, C7, C52), Van Emden #57 (217, 220), see also #30, 39.
- NOSODENDRIDAE: Arnett (559), Böving & Craighead (43, pl. 66), Chu (90), Crowson (72), Peterson (13, 60, C52).
- NOTERIDAE: Arnett (203), Böving & Craighead (17, pl. 5), Chu (77), Crowson (6), Peterson (8, 61, C42), Van Emden #57 (f. 35).
- NOTIOPHYGIDAE: See #65.
- OEDEMERIDAE: Arnett (737), Böving & Craighead (8, 40, 41, 60, pl. 51), Chu (112-113), Crowson (119), Peterson (18, 61, C4, C51), Van Emden #57 (220, 262), see also #135 (pupae only), 136.
- OMOPHRONIDAE: (see also Carabidae), Böving & Craighead (17, 71, pl. 5), Chu (76).
- ORTHOPERIDAE: Arnett (831), Böving & Craighead (26, 36, pl. 34), Chu (106), Crowson (98), Peterson (15, 17, 62, C50), Van Emden #57 (219, 254).
- OSTOMIDAE: Arnett (593), Böving & Craighead (56, pl. 93-94), Chu (100), Peterson (15, 62, C1, C3, C6, C10, C54), see also #42.
- OTHNIIDAE: Arnett (711), Böving & Craighead (42, 60, pl. 47), Chu (115), Peterson (17, 63, C50).
- OXYCORYNIDAE: (see also Curculionidae), Crowson (156).
- PASSALIDAE: Arnett (391), Böving & Craighead (11, 52, pl. 87) Chu (87), Crowson (43), Peterson (9, 64, C31), see also #134.
- PASSANDRIDAE: (see also Cucujidae), Crowson (91).
- PAUSSIDAE: Böving & Craighead (25, pl. 7), Chu (78), Crowson (5).

- PEDILIDAE: Arnett (743), Böving & Craighead (41, 60, pl. 53), Chu (114), Crowson (135).
- PELTIDAE: See #42.
- PEROTHOPIDAE: Undescribed.
- PETRIIDAE: Undescribed.
- PHALACRIDAE: Arnett (823), Böving & Craighead (12, 14, 36, pl. 32-33), Chu (106), Crowson (96), Peterson (14, 16, 64, C51), Van Emden #57 (217, 254, f. 47).
- PHENGODIDAE: Arnett (531), Böving & Craighead (48, pl. 74-75), Chu (98), Crowson (67), Peterson (11, 64, C56).
- PHLOEPHILIDAE: See #42.
- PHYCOSECIDAE: See #42.
- PLASTOCERIDAE: See Elateridae.
- PLATYPODIDAE: Arnett (1029), Böving & Craighead (67, pl. 123), Chu (128), Crowson (164), Peterson (7, 65, C26), Van Emden #57 (211, 265, f. 5), Van Emden #58 (269).
- PLATYPSYLLIDAE: Arnett (339), Böving & Craighead (25, 27, pl. 12), Chu (81), Crowson (29), see also #180.
- PLATYSTOMIDAE: See Anthribidae.
- PROPALTICIDAE: Undescribed.
- PROTERHINIDAE: (see also Curculionidae), Böving & Craighead (66, pl. 119), Chu (125), Crowson (156).
- PROTUCUCUJIDAE: Undescribed.
- PSELAPHIDAE: Arnett (311), Böving & Craighead (11, 25, 30, 31, pl. 19), Chu (84), Crowson (31), Van Emden #57 (216, 226), see also #91, 124.
- PSEPHENIDAE: Arnett (457), Böving & Craighead (45, pl. 70), Chu (92), Crowson (54), Peterson (13, 66, C43), see also #169.
- PSOIDAE: (see also Bostrichidae) Böving & Craighead (62, pl. 102).
- PTEROGENIIDAE: Undescribed.
- PTILIIDAE: Arnett (349), Böving & Craighead (25, 26, 43, pl. 10), Chu (80), Crowson (28), Peterson (15), Van Emden #57 (213, 217, 225, f. 40), see also #91, 124.
- PTILODACTYLIDAE: Arnett (460), Böving & Craighead (8, 44, 45, pl. 67-69), Chu (92), Crowson (54), Peterson (12, 14, 66, C30), see also #157.
- PTINIDAE: Arnett (577), Böving & Craighead (62, pl. 101), Chu (119), Crowson (77), Peterson (10, 15, 67, C2, C30), Van Emden #57 (215, 264, f. 9, f. 14), see also #74, 81, 82.
- PYROCHROIDAE: Arnett (719), Böving & Craighead (41, 60, pl. 53) Chu (114), Crowson (118), Peterson (17, 67, C1, C4, C49), Van Emden #57 (219, 262), Van Emden #58 (261, f. 31, f. 34-36), see also #158.
- PYTHIDAE: (see also Salpingidae) Böving & Craighead (41, 42, 60, pl. 54), Chu (114-115), Crowson (118), Peterson (16-18, 68, C52) Van Emden #57 (219, 262).
- RHIPICERIDAE: Arnett (491), Böving & Craighead (13, 49, 50, pl. 79, pl. 82), Chu (93, 96), Crowson (57), Peterson (11, 68, C2, C51).
- RHIPIPHORIDAE: Arnett (633), Böving & Craighead (59-60, pl. 97), Chu (86), Crowson (119), Peterson (10), Van Emden #57 (212, 214, 260), Van Emden #58 (223).
- RHIZOPHAGIDAE: Arnett (767), Böving & Craighead (33, pl. 28), Chu (103), Crowson (93), Van Emden #57 (218, 256, f. 46.).
- RHYSODIDAE: Arnett (49), Böving & Craighead (16, pl. 3), Chu (75), Crowson (5), Peterson (8).
- SAGRIDAE: (see also Chrysomelidae), Böving & Craighead (63, pl. 104).
- SALPINGIDAE: Arnett (713), Böving & Craighead (40-41, 60, pl. 48, pl. 54), Chu (111), Crowson (117).
- SANDALIDAE: see Rhipiceridae.
- SAROTHRIDAE: Undescribed.
- SCAPHIDIIDAE: Arnett (363), Böving & Craighead (25, 27, pl. 12), Chu (82), Crowson (31), Peterson (12, 14, 69, C55), Van Emden #57 (213, 225, f. 39), see also #91, 124.
- SCARABAEIDAE: Arnett (395), Böving & Craighead (52-55, pl. 87-88), Chu (88-89), Crowson (43), Peterson (9, 69, C4-7, C9-12, C31), Van Emden #57 (215), see also #5, 40, 54, 61, 70, 84, 85, 88-90, 112, 113, 123, 134, 144, 175.

- SCOLYTIDAE: Arnett (1031), Böving & Craighead (67, pl. 123), Chu (126), Crowson (164), Peterson (7, 70, C26-27), Van Emden #57 (211, 264), also see #76, 164, 165, 167.
- SCRAPTIIDAE: (See also Melandryidae), Böving & Craighead (39, pl. 44), Chu (110), Crowson (119), Van Emden #57 (220, 260, f. 2, f. 29).
- SCYDMAENIDAE: Arnett (357), Böving & Craighead (11, 25, 30-31, pl. 16, pl. 19), Crowson (31), Peterson (13), Van Emden #57 (216, 226), see also #91, 124.
- SERROPALPIDAE: See Melandryidae.
- SILPHIDAE: Arnett (329), Böving & Craighead (25, 27, pl. 13), Chu (80, 82), Crowson (32), Peterson (12, 15, C2, C10, C55), Van Emden #57 (213, 225), see also #44, 91, 124.
- SILVANIDAE: (see also Cucujidae), Arnett (775), Böving & Craighead (8, 34, pl. 30), Chu (104), Crowson (95), Van Emden #57 (220).
- SMICRIPIDAE: (see also Rhizophagidae), Böving & Craighead (12, 33, 36, pl. 32), Chu (107), Crowson (93), no adequately illustrated description available.
- SPERCHEIDAE: (see also Hydrophilidae), Böving & Craighead (32, pl. 21) Chu (117, 118), Crowson (20), Van Emden #57 (216).
- SPHAERIIDAE: see #31.
- SPHAERITIDAE: Undescribed.
- SPHINDIDAE: Arnett (771), Böving & Craighead (34, 37-38, pl. 41), Chu (107), Crowson (95), Peterson (18), Van Emden #57 (220, 258), Van Emden #58 (219, f. 20).
- STAPHYLINIDAE: Arnett (233), Böving & Craighead (11, 25, 27-30, pl. 14-18), Chu (51, 81, 83), Crowson (31), Peterson (8, 12, 71, C5, C55), Van Emden #57 (212, 213, 216, 226), see also #11, 67, 81, 91, 124, 128, 129, 169 176.
- STYLOPIDAE: Arnett (639), Crowson (168), Van Emden #57 (211, 213, 215, 260).
- SYNCHROIDAE: (see also Melandryidae), Böving & Craighead (8, 39, 41, pl. 52), Chu (113), Van Emden #57 (219, 262), Van Emden #58 (261, f. 30).
- SYNTELIIDAE: Crowson (21), no adequately illustrated description available.
- TELEGEUSIDAE: Undescribed.
- TELEPHORIDAE: (=Lampyridae, Lycidae & Drilidae) Van Emden #57 (212, 214, 253, f. 20-21, f. 43).
- TENEBRIONIDAE: Arnett (645), Böving & Craighead (56, pl. 93-94), Chu (113, 115-116), Crowson (115), Peterson (16, 18, 72, C1, C4, C6, C10, C48), Van Emden #57 (219-220, 262), see also #33, 34, 43, 60, 79, 81, 83, 92-94, 103, 128, 132-136, 145, 150-153.
- TETRATOMIDAE: (see also Melandryidae) Crowson (119).
- THORICTIDAE: (see also Dermestidae) Crowson (72).
- THROSCIDAE: Arnett (513), Böving & Craighead (13, 50, 51, pl. 81), Chu (95), Crowson (62), Peterson (7, 73, C17), Van Emden #57 (214, 254).
- TORRIDINCOLIDAE: see #159.
- TRACHYPACHIDAE: (see also Carabidae), Crowson (5), see also #98.
- TRICHOPTERYGIDAE: see Ptiliidae.
- TRICTENOTOMIDAE: No adequately illustrated description available.
- TRIXAGIDAE: See Throscidae.
- TROGIDAE: (see also Scarabaeidae), Böving & Craighead (8, 52, pl. 87), Chu (88) Crowson (43), Peterson (9, 73), see also #5.
- TROGOSITIDAE: (see also Ostomidae), Crowson (82), Van Emden #57 (214, 253), Van Emden #58 (214, f. 7-10).
- ZOPHERIDAE: (see also Tenebrionidae), Böving & Craighead (41, pl. 52).

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LITERATURE NOTICES

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- Entomologische Arbeiten aus dem Museum G. Frey*. Vol. 22 for 1971 (edited by G. Scherer). 249p. [Contains 14 articles, mostly dealing with Coleoptera in the Frey museum. Volumes may be obtained on exchange by writing: Museum G. Frey, 8132 Tutzing bei München, Bundesrepublik Deutschland (West Germany)].
- PAPP, C. S. AND R. A. BROWN. 1970. *The magic of color printing*; for art classes, printers, and laymen who deal in printing. American Visual Aid Books. 119p.; 91 progressive prints in color. \$7.50. [A useful little book for anyone contemplating color printing; noted here because it was authored by one of our members, from whom it may be ordered: Charles S. Papp, 7451 Albezzia Ln., Sacramento, CA 95828].
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- Eastern Forest Insects* by Whiteford L. Baker. 1972. USDA Forest Service Misc. Publ. 1175:1-642; 207 fig. [This is essentially a revised edition of F. C. Craighead's "Insect enemies of eastern forests", USDA Misc. Publ. 657, published in 1950. The importance of Coleoptera is exemplified by its coverage (p. 113-273). Copies may be obtained for \$5.00 from the Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402 or by writing your congressman].

—R. E. Woodruff